IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: YUICHI TAGUCHI Application No.: 10/787,501 Filed: February 25, 2004 For: LOGICAL UNIT SECURITY FOR CLUSTERED STORAGE AREA NETWORKS Customer No.: 20350	Examiner: Unassigned Technology Center/Art Unit: 2186 Confirmation No.: 4999 **PETITION TO MAKE SPECIAL FOR NEW APPLICATION UNDER M.P.E.P. § 708.02, VIII & 37 C.F.R. § 1.102(d)**

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This is a petition to make special the above-identified application under MPEP § 708.02, VIII & 37 C.F.R. § 1.102(d). The application has not received any examination by an Examiner.

(a)   The Commissioner is authorized to charge the petition fee of $130 under 37 C.F.R. § 1.17(i) and any other fees associated with this paper to Deposit Account 20-1430.

(b)   All the claims are believed to be directed to a single invention. If the Office determines that all the claims presented are not obviously directed to a single invention, then Applicants will make an election without traverse as a prerequisite to the grant of special status.

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(c)   Pre-examination searches were made of U.S. issued patents, including a classification search and a foreign patent database search. The searches were performed on or around March 14, 2005, and were conducted by a professional search firm, Mattingly, Stanger Malur & Brundidge, P.C. The classification search covered Class 707 (subclass 9) and Class 711 (subclasses 111, 112, 152, 154, 164, and 173). Because of the large size of these subclasses, keywords were used to narrow of number of documents returned. The foreign patent database search was conducted using Espacenet database and Japanese patent database. The inventors further provided three references considered most closely related to the subject matter of the present application (see references #11-13 below), which were cited in the Information Disclosure Statement filed with the application on February 25, 2004.

(d)   The following references, copies of which are attached herewith, are deemed most closely related to the subject matter encompassed by the claims:

(1)   U.S. Patent No. 5,398,329;

(2)   U.S. Patent No. 6,061,750;

(3)   U.S. Patent No. 6,457,098 B1;

(4)   U.S. Patent Publication No. 2001/0020282 A1;

(5)   U.S. Patent Publication No. 2003/0126381 A1;

(6)   U.S. Patent Publication No. 2003/0200399 A1;

(7)   U.S. Patent Publication No. 2004/0015668 A1;

(8)   U.S. Patent Publication No. 2004/0098542 A1;

(9)   U.S. Patent Publication No. 2004/0139196 A1;

(10)   U.S. Patent Publication No. 2004/0143712 A1;

(11)   U.S. Patent Publication No. 2003/0014600 A1;

(12)   U.S. Patent No. 6,219,771 B1; and

(13)   U.S. Patent No. 6,041,381.

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(e)   Set forth below is a detailed discussion of references which points out with particularity how the claimed subject matter is distinguishable over the references.

A.   Claimed Embodiments of the Present Invention

The claimed embodiments relate to security of data in storage area networks and, more particularly, to security of data in a clustering system during take over of one host computer by another host computer.

Independent claim 25 recites, in a clustering system having a plurality of host computers coupled to a storage system and a management computer, wherein each of a plurality of logical units in the storage system is configured so that a logical unit in the storage system can be accessed only by one or more host computers, a method comprising storing access control information in the storage system for enabling a primary host computer to access a first logical unit; and changing the access control information in the storage system for enabling a secondary host computer to access the first logical unit based upon a request from the management computer. The request from the management computer is issued when taking over, at the secondary host computer, processing of the primary host computer.

Independent claim 29 recites, in a storage system coupled to at least a primary host computer and a secondary host computer and a management computer, wherein each of a plurality of logical units in the storage system is configured to be accessed by one or more host computers, a method comprising managing access control in the storage system so that the storage system permits access to the logical unit from the primary host computer and denies access to the logical unit from the secondary host computer; and changing the access control so that the storage system permits access to the logical unit from the secondary host computer based upon a request from the management computer when the secondary host computer takes over processing of the primary host computer.

One of the benefits that may be derived is an improved technique in a clustering environment by enabling dynamic changes in the logical unit security to allow a different host to access a particular portion of the storage after a failure.

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B.   Discussion of the References

1.   U.S. Patent No. 5,398,329

The patent to Hirata et al., US 5,398,329, discloses a communication system having a plurality of host computers and two communication control processors (CCP's) connected to the respective host computers. Each host computer establishes a connection with the CCP's. Once the master host computer detects a fault condition of a primary CCP, the master host computer sends an activation request to a secondary CCP. Upon receiving the activation request, the secondary CCP sends an output link request to all of the host computers. The method and system includes switching over from a primary CCP connected to a plurality of host computers to a secondary CCP, and automatically switching over to the secondary CCP upon failure of the primary CCP. See, e.g., Abstract; and column 7, line 40, through column 8, line 8.

This reference is directed to switching between two communication control processors, not take over of one host computer by another host computer. It fails to teach changing the access control to permit access to a logical unit from a secondary host computer based upon a request from the management computer, when the secondary host computer takes over processing of the primary host computer, as recited in independent claims 25 and 29.

2.   U.S. Patent No. 6,061,750

The patent to Beardsley et al., US 6,061,750, discloses a storage controller for interfacing between a plurality of host computers coupled to direct access storage devices. When a fault condition in the primary processor of the host controller is detected, the system configures the host adaptor and device adaptor to communicate with a secondary processor of the storage controller so that the secondary processor may take over the processing tasks of the primary processor of the storage controller.

This reference discloses that the first processor 14 of the storage controller 2 configures the second host adaptor 8 and the second device adaptor 20 to communicate with the first processor 14 when the second processor 12 of the storage controller 2 fails. It does not teach changing the access control to permit access to a logical unit from a secondary host

computer based upon a request from the management computer, when the secondary host computer takes over processing of the primary host computer, as recited in independent claims 25 and 29.

3. U.S. Patent No. 6,457,098 B1

The patent to DeKoning et al., US 6,457,098, discloses a method and apparatus for a storage subsystem that provides shared access to common storage devices within the storage subsystem by multiple storage controllers coupled with a host computer. One of a plurality of RAID controllers is designated as the primary controller with respect to each of the LUN's of the RAID subsystem. The primary controller is responsible for sharing access to the common disk drives of the LUN among all requesting controllers. A host computer desiring access to the shared disk drives of the LUN sends a message to the primary controller requesting an exclusive temporary lock of the relevant stripes of the LUN. The primary controller returns a grant of the requested lock when the exclusive lock is permissible. See, e.g., Abstract; and column 2, line 62, through column 3, line 11.

This reference is directed to a common shared subset of disk drives (LUNs) by a plurality of RAID controllers, not security during take over of one host computer by another host computer. It fails to teach changing the access control to permit access to a logical unit from a secondary host computer based upon a request from the management computer, when the secondary host computer takes over processing of the primary host computer, as recited in independent claims 25 and 29.

4. U.S. Patent Publication No. 2001/0020282 A1

The published patent application to Murotani et al., US 2001/0020282, discloses an external storage in a data processing system that includes host system and a plurality of host computers having ports possessing identifiers as individual port addresses, and a group of logical units that are controlled by and shared between the plurality of host computers. The plurality of host computers and logical units are accessible by a host system. When the primary host computer fails, the failed host computer recognizes the failure and enters a wait state, the control is transferred to a secondary host computer, to take over the processing for the primary host computer. See, e.g., Abstract, and paragraphs [0007]-[0011].

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This reference discloses that when a failure occurs in a controller, a substitute controller functions to receive control information of the failed controller, to reference the port address of the failed controller to add the contents thereof to its own port address, and to reset the port address in the failed controller to thereby erase the port address. It does not, however, teach changing the access control to permit access to a logical unit from a secondary host computer based upon a request from the management computer, when the secondary host computer takes over processing of the primary host computer, as recited in independent claims 25 and 29.

5.   U.S. Patent Publication No. 2003/0126381 A1

The published patent application to No. US 2003/0126381, discloses a plurality of host computers in which exclusive access to a shared resource is provided to one of the host computers. The system allows exclusive access to a first memory location in a shared memory location by a primary host computer on a first bus, while allowing access to a second memory location in the shared memory by a secondary host computer on a second bus. A request for exclusive access is made by the primary host computer. The request is granted and access to the second memory location is allowed during the exclusive access to the first memory location by the primary host computer. See, e.g., Abstract, and paragraphs [0008]-[0011].

The reference is directed to a switch coupled to a plurality of memory controllers to maintain a lock register to control access to a memory location. It fails to teach changing the access control to permit access to a logical unit from a secondary host computer based upon a request from the management computer, when the secondary host computer takes over processing of the primary host computer, as recited in independent claims 25 and 29.

6.   U.S. Patent Publication No. 2003/0200399 A1

The published patent application to Dawkins et al., US 2003/0200399, discloses a system and method for controlling access to a data storage device in a distributed information handling system. A plurality of host computers may access the data storage device. The control for accessing the storage device resides in the storage device itself. The storage device is partitioned into logical storage units, and a logical unit number mapping

table is used to determine which host computer may access which logical unit. See, e.g., Abstract; and paragraphs [0020] and [0042].

This reference is directed to a logical unit number mapping table used to determine which host computer may access which logical unit. It does not teach changing the access control to permit access to a logical unit from a secondary host computer based upon a request from the management computer, when the secondary host computer takes over processing of the primary host computer, as recited in independent claims 25 and 29.

7.   U.S. Patent Publication No. 2004/0015668 A1

The published patent application to McBrearty et al., US 2004/0015668, discloses a method and system for controlling multi-computer access to a disk storage system. An active access authorization is set for the primary host computer, enabling the primary host computer to read and write user and meta data to the disk storage system. McBrearty et al. also disclose switching over the control of a disk from a primary host computer to a secondary host computer in the event of a fault condition on the primary host computer. The disk reservation is released from the primary host computer, and then the disk is accessible to by the secondary host computer.

The reference is directed to logical volume management (LVM) for controlling multi-node access to a disk storage system, including concurrent access mode and non-concurrent access mode (see paragraph [0007]), but does not relate to security of data in a clustering system during take over of one host computer by another host computer. Thus, it fails to teach changing the access control to permit access to a logical unit from a secondary host computer based upon a request from the management computer, when the secondary host computer takes over processing of the primary host computer, as recited in independent claims 25 and 29.

8.   U.S. Patent Publication No. 2004/0098542 A1

The published patent application to Araki et al., US 2004/0098542, discloses a data storage system coupled to a plurality of host computers, which can provide exclusive control for the processing of stored data. The storage system comprises a control unit coupled to a plurality of host computers for receiving 110 processing requests to control data

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transfers between the host computers and a plurality of storage devices. See, e.g., Abstract; and paragraphs [0006]-[0008].

In this reference, information concerning extent (extent range) of an I/O processing request issued by a host processor is stored in a control memory incorporated in a control unit for allowing the control unit to make decision as to overlap of the extents of the input/output processings to effectuate exclusive control on an extent-by-extent basis. It does not teach changing the access control to permit access to a logical unit from a secondary host computer based upon a request from the management computer, when the secondary host computer takes over processing of the primary host computer, as recited in independent claims 25 and 29.

9.   U.S. Patent Publication No. 2004/0139196 A1

The published patent application to Butler et al., US 2004/0139196 discloses an information handling system that uses a releasable reservation protocol for obtaining access to a device. Butler et at also discloses that if the system determines that the primary host computer has experienced a fault condition, then the reservation to a target device held by the primary host computer is released, and control is transferred to a secondary host computer. See, e.g., Abstract; Fig. 3B; and paragraphs [0005]-[0007].

The reference is directed to releasing a reservation held by a first host on a target device, by the first host, when the first host has failed, and reserving the target device to the second host. It does not involve changing the access control based upon a request from a management computer. Thus, the reference fails to teach changing the access control to permit access to a logical unit from a secondary host computer based upon a request from the management computer, when the secondary host computer takes over processing of the primary host computer, as recited in independent claims 25 and 29.

10.   U.S. Patent Publication No. 2004/0143712 A1

The published patent application to Armstrong et al., US 2004/0143712, discloses a task synchronization mechanism that operates on a global lock that is shared between host computers on local locks that are not shared between host computers. The local locks are host-computer-specific locks. Each host-computer-specific lock is dedicated to a particular host computer in the system. The system may perform exclusive access or shared

access to the resource. When shared access to a resource is required, a host computer updates its hostcomputer-specific lock to indicate the host computer is sharing the resource. When exclusive access to the resource is required, the requesting host computer waits until the count of all host-computer-specific locks indicates that none of the host computers have a lock on the resource. Once no host computer has a lock on the resource, exclusive access to the resource may be granted. See, e.g., Abstract; and paragraphs [0007]-[0008].

The reference relates to a task synchronization mechanism to provide shared access or exclusive access to a resource by multiple processors. It fails to teach changing the access control to permit access to a logical unit from a secondary host computer based upon a request from the management computer, when the secondary host computer takes over processing of the primary host computer, as recited in independent claims 25 and 29.

11.   U.S. Patent Publication No. 2003/0014600 A1

This published application to Ito et al. uses a management table 701 inside the storage subsystem 101 and gives logical unit inside the storage subsystem to host computer group arbitrarily grouped by a user in accordance with the desired form of operation of the user (step 601). According to the management table 701, the host computers are given access approval/rejection to the logical units inside the storage subsystem. The grouping provides the security function capable of setting interface of connection in the group unit under a single port of storage subsystem without changing existing processing, limitation, and other functions of the computer. See paragraphs [0070], [0080], and [0100]-[0101].

The reference is directed to a management table inside the storage subsystem to provide access approval/rejection to the logical unit inside the storage subsystem. It does not, however, teach changing the access control to permit access to a logical unit from a secondary host computer based upon a request from the management computer, when the secondary host computer takes over processing of the primary host computer, as recited in independent claims 25 and 29.

12.   U.S. Patent No. 6,219,771 B1

The patent to Kikuchi et al. discloses a control device 106 having an address registration unit 104, in which the host address of each host device has been registered for authorizing access, a command interpretation and execution unit 102 which on receipt of a

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command from a host device via a host device interface outputs the host address of the host device based on the command, and an address verification unit 103 for verifying the host address output from a command interpretation and execution unit against the host address registered in the address registration unit, as well as determining whether or not the particular host device has access authorization. The command interpretation and execution unit 102 incorporates an authorization pending function, so that on receipt of a command from a host device, the command is interpreted and executed only after access is authorized by the address verification unit 103. See column 4, lines 1-16; and Fig. 1.

The reference relates to a control device that enables access authorization to be assigned solely to specific host devices, and a command interpretation and execution unit that interprets and executes a command only after access is authorized by an address verification unit. It does not, however, teach changing the access control to permit access to a logical unit from a secondary host computer based upon a request from the management computer, when the secondary host computer takes over processing of the primary host computer, as recited in independent claims 25 and 29.

13.   U.S. Patent No. 6,041,381

The patent to Hoese discloses a Fibre Channel to SCSI Addressing method and system is provided. The system associates with a Fibre Channel and a SCSI bus. The system further maintains a Fibre Channel to SCSI routing table 90 and a SCSI to Fibre Channel routing table 92. The system receives a cross bus transfer of data that originates on either the Fibre Channel or the SCSI bus, respectively, and wherein the cross bus transfer is intended for a target on the SCSI bus or Fibre Channel, respectively. The apparatus translates addressing information contained in the cross bus transfer by referencing either the Fibre Channel to SCSI routing table 90 or the SCSI to Fibre Channel routing table 92.
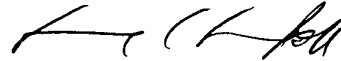
This reference is directed to Fibre Channel to SCSI addressing, not security of data in a clustering system during take over of one host computer by another host computer. Thus, it does not teach changing the access control to permit access to a logical unit from a secondary host computer based upon a request from the management computer, when the secondary host computer takes over processing of the primary host computer, as recited in independent claims 25 and 29.

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(f)   In view of this petition, the Examiner is respectfully requested to issue a first Office Action at an early date.

Respectfully submitted,

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Attachments
RL:rl
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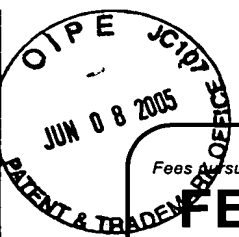
Effective on 12/08/2004.
Fees Pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).

FEE TRANSMITTAL
For FY 2005

☐ Applicant claims small entity status. See 37 CFR 1.27

| TOTAL AMOUNT OF PAYMENT | ($) 130.00 |

Complete if Known	
Application Number	10/787,501
Filing Date	February 25, 2004
First Named Inventor	Taguchi, Yuichi
Examiner Name	Unassigned
Art Unit	2186
Attorney Docket No.	16869B-084300US

METHOD OF PAYMENT (check all that apply)

☐ Check ☐ Credit Card ☐ Money Order ☐ None ☐ Other (please identify): _____

☒ Deposit Account   Deposit Account Number: 20-1430   Deposit Account Name: Townsend and Townsend and Crew LLP

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

☒ Charge fee(s) indicated below   ☐ Charge fee(s) indicated below, **except for the filing fee**

☒ Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17   ☒ Credit any overpayments

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038

FEE CALCULATION

1. BASIC FILING, SEARCH, AND EXAMINATION FEES

Application Type	FILING FEES Fee ($)	Small Entity Fee ($)	SEARCH FEES Fee ($)	Small Entity Fee ($)	EXAMINATION FEES Fee ($)	Small Entity Fee ($)	Fees Paid ($)
Utility	300	150	500	250	200	100	_____
Design	200	100	100	50	130	65	_____
Plant	200	100	300	150	160	80	_____
Reissue	300	150	500	250	600	300	_____
Provisional	200	100	0	0	0	0	_____

2. EXCESS CLAIM FEES

Fee Description	Fee ($)	Small Entity Fee ($)
Each claim over 20 or, for Reissues, each claim over 20 and more than in the original patent	50	25
Each independent claim over 3 or, for Reissues, each independent claim more than in the original patent	200	100
Multiple dependent claims	360	180

Total Claims	Extra Claims	Fee ($)	Fee Paid ($)	Multiple Dependent Claims Fee ($)	Fee Paid ($)
_____ -20 or HP = _____	x _____	= _____		_____	_____

HP = highest number of total claims paid for, if greater than 20

Indep. Claims	Extra Claims	Fee ($)	Fee Paid ($)
_____ -3 or HP = _____	x _____	= _____

HP = highest number of independent claims paid for, if greater than 3

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof	Fee ($)	Fee Paid ($)
_____ - 100 = _____	/ 50 = _____ (round up to a whole number)	x _____	= _____

4. OTHER FEE(S)

Fees Paid ($)

Non-English Specification, $130 fee (no small entity discount)   _____

Other: **PETITIONS TO THE COMMISSIONER** _____   130.00

SUBMITTED BY

Signature		Registration No. (Attorney/Agent) 41,405	Telephone 650-326-2400
Name (Print/Type)	Chun-Pok Leung		Date June 8, 2005

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